

REMARKS

Favorable reconsideration of this application is requested in view of the above amendment and the following remarks. Claims 1-15 are pending in the present application. Reconsideration of the application and a favorable response are respectfully requested.

As required, the Title of the application has been amended.

Drawings objections

The drawings are objected to because in claim 1 it is claimed that the planes are not parallel (Figure 4A, 4B), but in Figure 4C, both planes are shown parallel. Applicants believe that claim 1 and Figure 4 had been misunderstood. The embodiment of claim 1 requires that the direction of the thickness shear vibration is nonparallel to the side of the piezoelectric substrate (31C in Fig. 4). This corresponds to the crystalline axes A and B in Figures 4A and 4B. Figure 4C does not show the direction of the crystalline axis that is in the YZ plane. See page 12, lines 21-34 of the specification. Therefore, there is no inconsistency.

In view of foregoing, Applicants request the reconsideration and withdrawal of this objection.

Claim rejections - 35 U.S.C. § 112, second paragraph

Claims 1-15 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter. Applicants respectfully traverse this rejection.

As discussed above, there is no inconsistency between claim 1 and Figure 4C. Furthermore, Applicants believe that claims 4 and 5 are readily understood, particularly in view of page 8, lines 21-26 and page 9, lines 18-22 of the specification.

In view of foregoing, Applicants request the reconsideration and withdrawal of this rejection.

Claim rejections - 35 U.S.C. § 102(b)

Claims 1 and 2 are rejected under 35 U.S.C. 102(b) as being anticipated by Kasanami et al., US patent 6,104,132. Applicants respectfully traverse this rejection.

Kasanami et al. discloses a piezoelectric element comprising a piezoelectric substrates 16a to 16d that are bonded to a vibrating body 14 via conductive adhesive, see Figures 20 and 21. Examples of the material for the vibrating body 14 include those that have no piezoelectric property, such as Ni, Cr and Ti alloys, see column 4, lines 53-54. The element disclosed by Kasanami et al. is called a "biomorph structure". Bending vibration is caused by vibration of the piezoelectric substrate, column 5, lines 23-26, and column 6, lines 7-11. This bending motion is a vibration mode different from the thickness shear vibration, and Kasanami et al. does not disclose an element causing thickness shear vibration. Furthermore, as is apparent from Figures 19-21, in the element of Kasanami et al., electrodes 20a and 22a are formed over the entire surface of a piezoelectric layer 18a. Therefore, the normal line of the end portions of the electrodes is parallel to the side wall of the piezoelectric layer 18a. } NIC ✓

In contrast, claim 1 requires a piezoelectric element in which a thickness shear vibration occurs. This vibration is generated by applying a voltage to electrodes formed on the first principal plane and the second principal plane of the piezoelectric substrate. The vibration direction therefore is vertical to the thickness direction of the substrate and the end portions of the electrodes. More specifically, the thickness shear vibration according to claim 1 occurs in a direction nonparallel to a side wall of the piezoelectric substrate. The use of a piezoelectric element utilizing a thickness shear vibration mode is directed to a configuration for suppressing unnecessary spurious vibration. } NIC

Kasanami et al. does not disclose a piezoelectric element utilizing a thickness shear vibration mode, and wherein the vibration direction of the thickness shear vibration is nonparallel to the side wall. Thus, claims 1 and 2 are not anticipated by Kasanami et al.

Claim rejections - 35 U.S.C. § 103(a)

Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kasanami et al. in view of Yanagihara et al. Applicants respectfully traverse this rejection. Even if Yanagihara et al. discloses the use of LiTaO_3 , Yanagihara et al. does not remedy the deficiencies of Kasanami et al. noted above. Applicants are not conceding the relevance of Kasanami et al. or Yanagihara et al. to the features of claim 3.

Claims 9 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasanami et al. in view of Mandai et al. Applicants respectfully traverse this rejection. Mandai et al. does not remedy the deficiencies of Kasanami et al. noted above. Applicants are not otherwise conceding the relevance of Kasanami et al. or Mandai et al. to the features of claims 9 and 15.

Claims 4, 5, 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasanami et al. in view of Yanagihara et al. and Mandai et al. and ordinary skill in the art. Applicants respectfully traverse this rejection. Yanagihari et al. and Mandai et al. do not remedy the deficiencies of Kasanami et al. noted above. Applicants are not conceding the relevance of Kasanami et al. or Yanagihara et al. or Mandai et al. to the features of claims 4, 5, 10 and 11.

Claims 6-8 and 12-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kasanami et al. in view of Yanagihara et al. and Mandai et al. and ordinary skill in the art. Applicants respectfully traverse this rejection. Yanagihari et al. and Mandai et al. do not remedy the deficiencies of Kasanami et al. noted above. Applicants are not conceding the relevance of Kasanami et al. or Yanagihara et al. or Mandai et al. to the features of claims 6-8 and 12-14.

Thus, Kasanami et al. does not anticipate claim 1. Claims 2-15 depend from claim 1, and therefore, they are patentable for at least the same reasons. Applicants are not otherwise conceding the relevance of Kasanami et al. in view of Yanagihara et al. and Mandai et al. and ordinary skill in the art to the features of claims 2-15.

In view of the above, it is respectfully submitted that the present application is in condition for allowance. Reconsideration of the present application and a favorable response are respectfully requested.

If a telephone conference would be helpful in resolving any issues concerning this communication, please contact Applicants' primary attorney-of record, Douglas P. Mueller (Reg. No. 30,300), at (612) 371-5237.

Respectfully submitted,

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By



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